Virginia Information Technologies Agency

Developing a Commonwealth GIS Data Standard for PSAP Boundaries

Brian Crumpler & Tim Addington
ISP Regional Coordinators

PSAP Boundary Data Standard Workgroup
February 1, 2017

Agenda

- Workgroup Charter: Discussion / Approval
- NG9-1-1 Call Routing Concepts
- Possible Data Schema/Geometry Sources
  - Proposed NENA NG9-1-1 GIS Data Model
  - Existing NENA Legacy GIS Data Model
  - Statewide MSAG/ALI/GIS Analysis
- Discussion Questions
- Next Steps

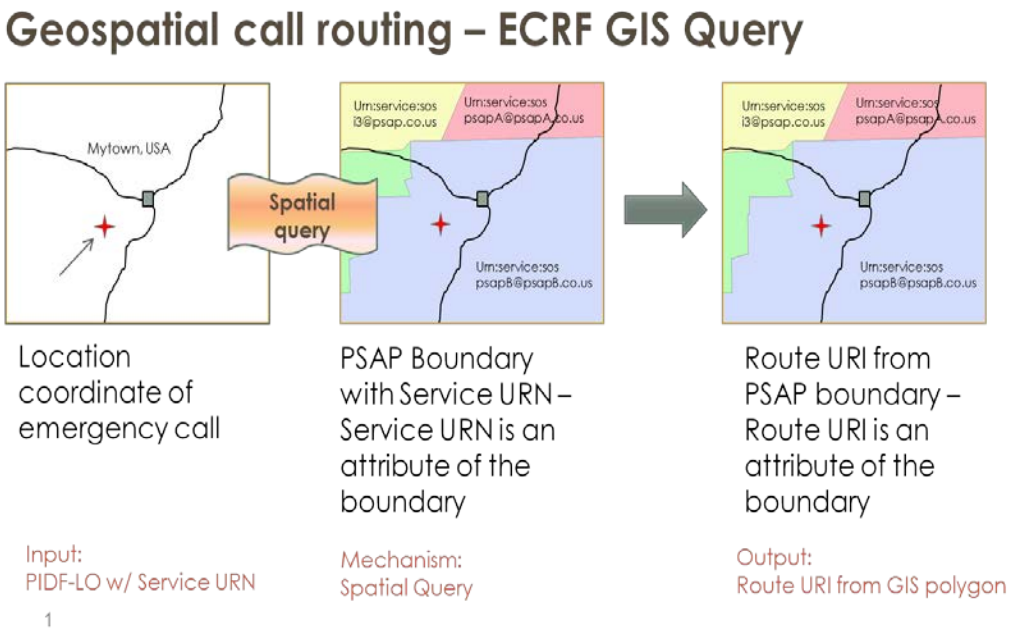
Workgroup Charter

- Discussion of any changes or modifications based on workgroup review of the charter

- Approval of charter

Key NG9-1-1 Call Routing Concepts

- Point in Polygon Routing
- Includes Service URN (Uniform Resource Name)
  - Value for PSAP Boundaries: “urn:nena:service:sos.psap”
- Returns a Service URI (Uniform Resource Identifier)
  - Says where a call goes (SIP location or a phone #)



Other Service Boundaries

- NG9-1-1 service boundaries may also be created for other Service URN values

11.3.5 Initial Values "urn:nena:service:sos".

Name	Purpose
psap	Route calls to primary PSAP
level_2_esrp	Route calls to a second level ESRP (for an example, a state ESRP routing towards a county ESRP)
level_3_esrp	Route calls to a third level ESRP (for example, a regional ESRP that received a call from a state ESRP and in turn routes towards a county ESRP).
call_taker	Route calls to a call taker within a PSAP

11.5.5 Initial Values "urn:nena:service:responder".

Name	Description
police	Police Agency
fire	Fire Department
ems	Emergency Medical Service
poison_control	Poison Control Center
mountain_rescue	Mountain Rescue Service
federal_police	An appropriate federal agency (subregistry defined below)
sheriff	Sheriff's office, when both a police and Sheriff dispatch may be possible
stateProvincial_police	State or provincial police office
coast_guard	Coast Guard station
psap	other purposes beyond use for dispatch via ECRF

Note: Primary focus of this workgroup is PSAP boundaries. However, the NENA schema for other NG9-1-1 service boundaries contains the same fields but with a different value in the Service URN field.

Possible Data Schema Sources

Proposed NENA NG9-1-1 GIS Data Model

- Defined in NENA-STA-006 DRAFT ("NENA Standard for NG9-1-1 GIS Data Model")
- Published for FIRST Public Review December 2016

Legacy NENA GIS Data Model

- Defined in NENA Standard 02-010 v9 ("NENA Standards Data Formats for 9-1-1 Data Exchange & GIS Mapping")
- Published March, 2011

VITA Statewide MSAG/ALI/GIS Analysis

- Includes an "unpublished" dataset, used to support QA/QC data quality checks and the statewide analysis
- Completed Fall 2016

NENA NG9-1-1 GIS Data Model

Descriptive Name	Field Name	M/C/O	Type	Field Width
Source of Data	Source	M	T	75
Date Updated	DateUpdate	M	D	20
Effective Date	Effective	O	D	20
Expiration Date	Expire	O	D	20
Emergency Service Boundary NENA Globally Unique ID	ES_NGUID	M	T	100
State	State	M	T	2
Agency ID	Agency_ID	M	T	100
Service URI	ServiceURI	M	T	254
Service URN	ServiceURN	M	T	50
Service Number	ServiceNum	O	T	15
Agency vCard URI	AVcard_URI	M	T	254
Display Name	DsplayName	M	T	60

Table 4-2 PSAP Boundary Data Layer

When Should Fields Be Populated?

- PSAPs Can Start Now
  - Source of Data
  - Date Updated
  - State
  - Display Name
  - *Effective Date*
  - *Expiration Date*
  - Service URN
  - *Service Number*

- Work w/ NG Vendor
  - Globally Unique ID
  - Agency ID
  - Service URI
  - Agency vCard URI

Fields in italics are optional per NENA GIS Data Model

Fields PSAPs Can Start to Populate

5.117 Source of Data

Description: Agency that last updated the record, usually the name of the 9-1-1 Authority. This MAY be represented by the domain name of the agency.
Domain: None
Example: Metropolitan Regional Addressing Authority; Vermont911.st.us.gov

5.37 Date Updated

Description: The UTC date and time that the record was created or last modified. This value SHOULD be populated upon modifications to attributes, geometry, or both.
Domain: Restricted to ISO 8601 compliant values in Coordinated Universal Time (UTC). Values are not allowed to be in the future.
Example: 2010-12-19T20:01:29-05 (representing a record updated on December 19, 2010 at 8:01 and 29 seconds PM US Eastern Standard Time)

Fields PSAPs Can Start to Populate

5.119 State

Description: The name of a state or state equivalent, represented by the two-letter abbreviation given in USPS Publication 28 [12], Appendix B.
Domain: ISO 3166-2 includes the same abbreviations as USPS Publication 28, Appendix B, with the exception of the additional one for the nine minor uninhabited islands owned by the US: These abbreviations are also freely available at https://www.census.gov/geo/reference/ansi_statetables.html
Example: TN; NM; OR

5.38 Display Name

Description: A description or "name" of the service provider that offers services within the area of a PSAP or an Emergency Service Boundary. This value MUST be suitable for display to human users.
Domain: None
Example: New York Police Department; Med-Life Ambulance Services

Fields PSAPs Can Start to Populate

5.39 Effective Date

Description: The UTC date and time that the record is scheduled to take effect.
Domain: Timestamp as defined in NENA-STA-010 [1] that in turn conforms to W3C dateTime.
Example: 2010-10-09T13:01:35-04 (representing a record that will become active on October 9, 2010 at 1:01 and 35 seconds PM US Eastern Daylight Time); 2010-02-18T02:30:00-05 (representing a record that will become active on February 18, 2010 at 2:30 and 0 seconds AM US Eastern Standard Time)

NOTE: This field is used when time and date of a change is known. For example, the time and date an annexation takes effect.

5.46 Expiration Date

Description: Date when the information in the record is no longer considered valid.
Domain: TimeStamp as defined in NENA-STA-010 [1] that in turn conforms to W3C dateTime.
Example: 2010-10-09T13:01:35-04 (representing a record will expire and no longer be valid on October 9, 2010 at 1:01 and 35 seconds PM US Eastern Daylight Time); 2010-02-18T02:30:00-05 (representing a record that will expire and no longer be valid on February 18, 2010 at 2:30 and 0 seconds AM US Eastern Standard Time).

NOTE: This field is used when the time and date of a change is known. For example, the time and date an annexation takes effect and the previous boundary is retired.

Fields PSAPs Can Start to Populate

5.114 Service URN

Description: The URN used to select the service for which a route is desired. The ECRF is queried with a location and a service URN that returns the Service URI.
Domain: RFC 5031 defines the Service URN, NENA-STA-010 [1] defines the domain of allowable values

11.3.5 Initial Values "urn:nena:service:sos".

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coast_guard	Coast Guard station
psap	other purposes beyond use for dispatch via ECRF

Primary focus of this workgroup is PSAP boundaries, but URNs for other service boundaries are shown above. Service URN for PSAP boundaries is "urn:nena:service:sos.psap"

Fields to Coordinate w/ NG9-1-1 Vendor

5.41 Emergency Service Boundary NENA Globally Unique ID

Description: The NENA Globally Unique ID for each Emergency Service Boundary and PSAP Boundary. Each record in the Emergency Service Boundary layer and the PSAP Boundary layer MUST have a globally unique ID. When coalescing data from other local 9-1-1 Authorities into the ECRF and LVF, this unique ID MUST continue to have only one occurrence. One way to accomplish this is to append the 9-1-1 Authority's domain to the end of the internally calculated feature ID. Emergency Service Boundary data is unique in that the data fields and their attributes are only a template to be reused for each Emergency Service Boundary. For the Emergency Service Boundary there MAY be a separate dataset for Law, Fire, and EMS, and other Emergency Services such as Poison Control, Forest Service, Coast Guard, and potentially many others.

Domain: None

Example: It is suggested that the Emergency Service Boundary NENA Globally Unique ID start with the type of emergency service (e.g. EMS, LAW, FIRE, PSAP).

- Feature ID 243 in the EMS Emergency Service Boundary layer would be represented as EMS243@911Authority_domain.state.us
- Feature ID 44 in the Law Emergency Service Boundary layer would be represented as LAW44@911Authority_domain.state.us
- Feature ID 18 in the Fire Emergency Service Boundary layer would be represented as FIRE18@911Authority_domain.state.us
- Feature ID 7 in the PSAP Boundary layer would be represented as PSAP7@911Authority_domain.state.us

NOTE: When an Emergency Service Boundary crosses into one or more states, the Emergency Service Boundary SHOULD be split at the State Boundary or State Equivalent with the State and the Emergency Service Boundary NENA Globally Unique ID being the only difference in the attributes.

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Fields to Coordinate w/ NG9-1-1 Vendor

5.9 Agency ID

Description: A Domain Name System (DNS) domain name which is used to uniquely identify the agency represented by the boundary.
Domain: MUST be a registered DNS domain name. See NENA Registry System at: https://www.nena.org/?nena_registry_system
Example: psap.harriscounty.tx.us

5.10 Agency vCard URI

Description: The vCard is a file format standard for electronic business cards. The Agency vCard URI is the internet address of an XML data structure which contains contact information (Name of Agency, Contact phone numbers, etc.) in the form of a vCard (RFC 6350).
Domain: None
Example: http://tools.ietf.org/html/rfc6350

Fields to Coordinate w/ NG9-1-1 Vendor

5.113 Service URI

Description: URI for call routing. This attribute is contained in the Emergency Service Boundary layer and will define the Service URI of the service. The URI is usually a Session Initiation Protocol (e.g. SIP or SIPs) URI but MAY be a telephone number (e.g. tel) URI that defines the route to reach the service.
Domain: Registered domain name; RFC 1035 (available at https://www.ietf.org/rfc/rfc1035.txt) defines the process to register a domain name.
Example: sips:sos.psap@eoc.houston.tx.us; tel:+12025551212

5.112 Service Number

Description: The numbers that would be dialed on a 12-digit keypad to reach the emergency service appropriate for the location. This is not the same as an Emergency Service Number (ESN) in Legacy E9-1-1 systems.
Domain: A dialable number or dial string
Example: 911

Pre-NG9-1-1 NENA GIS Data Model

1.4 D. Emergency Service Agency Boundary Layer (Required)

ATTRIBUTE NAME	USE R/O	TYPE	DATA DESCRIPTION
PSAP ID	R	AN	Code identifying the PSAP as listed in the FCC PSAP registry http://www.fcc.gov/pshs/services/911-services/enhanced911/psapregistry.html
County Name	R	AN	County Name as given in FIPS 6-4 [1]
County Code	R	N	FIPS County Code as given in FIPS 6-4 [1]
Agency ID	R	N	Emergency Service Agency ID
Source of Data	R	A	Agency that last updated the record
Date Updated	R	N	Date of last update Format: CCYY-MM-DD

Basic Schema for service boundaries for responding agencies:
Example: Chesterfield County Police Department

Pre-NG9-1-1 NENA GIS Data Model

Closest approximation to PSAP Boundaries from the legacy NENA GIS Data Model

Not in NG9-1-1 Data Model

1.4 B. Emergency Service Zone Boundary Layer (Required)

ATTRIBUTE NAME	USE R/O	TYPE	DATA DESCRIPTION
Community ID	R	N	Unique Community ID Number i.e. FIPS, GEOCODES, etc.
County Name	R	AN	County Name as given in FIPS 6-4 [1]
County Code	R	N	FIPS County Code as given in FIPS 6-4 [1]
PSAP ID	R	AN	Code identifying the PSAP as listed in the FCC PSAP registry http://www.fcc.gov/pshs/services/911-services/enhanced911/psapregistry.html
Agency ID	R	N	Emergency Service Agency ID
ESN	R	AN	Emergency Service Number associated with the ESZ
Source of Data	R	A	Agency that last updated the record
Date Updated	R	N	Date of last update Format: CCYY-MM-DD

Statewide MSAG/ALI/GIS Analysis

OBJECTID_1 *	Shape *	LOCAL_ESN	LOCAL_COM	LOCAL_FIELD_USE	ZONE_GEOCODE	ESN_FIPS	ESN_STATE	CHECK	MSAG_COMM	MSAG_ESN	Shape_Length	Shape_Area
5045	Polygon	<Null>	P	<Null>	NEW CASTLE	51045	VA	GIStoMSAG	NEWPORT	84	728.1245	17193.955466
5046	Polygon	<Null>	P	<Null>	NEWPORT	51045	VA	GIStoMSAG	NEW CASTLE	80	3055.444166	425099.376728
4960	Polygon	<Null>	P	<Null>	BUCHANAN	51023	VA	GIStoMSAG	BUCHANAN	192	116974.973786	363528953.445922
5047	Polygon	<Null>	P	<Null>	NEW CASTLE	51023	VA	GIStoMSAG	NEW CASTLE	199	8908.854009	3365607.118693
5048	Polygon	<Null>	P	<Null>	SALEM	51023	VA	GIStoMSAG	SALEM	195	16915.17012	17359875.807277
5049	Polygon	<Null>	P	<Null>	CLIFTON FORGE	51023	VA	GIStoMSAG	CLIFTON FORGE	198	12882.539412	7845884.876348
5050	Polygon	<Null>	P	<Null>	NATURAL BRIDGE	51023	VA	GIStoMSAG	NATURAL BRIDGE	192	9922.078333	6603336.174063
5051	Polygon	<Null>	P	<Null>	EAGLE ROCK	51023	VA	GIStoMSAG	EAGLE ROCK	191	102835.791847	338364625.863637
5052	Polygon	<Null>	P	<Null>	TROUTVILLE	51023	VA	GIStoMSAG	TROUTVILLE	194	47381.224016	54135120.546678
5055	Polygon	<Null>	P	<Null>	FINCASTLE	51023	VA	GIStoMSAG	FINCASTLE	193	80011.395621	178983329.147365
5056	Polygon	<Null>	P	<Null>	DALEVILLE	51023	VA	GIStoMSAG	DALEVILLE	194	29999.188223	24798147.179223
5057	Polygon	<Null>	P	<Null>	ROANOKE	51023	VA	GIStoMSAG	ROANOKE	197	22695.989225	12690159.055552
5058	Polygon	<Null>	P	<Null>	CLOVERDALE	51023	VA	GIStoMSAG	CLOVERDALE	194	8588.335206	2265879.213601
5059	Polygon	<Null>	P	<Null>	BLUE RIDGE	51023	VA	GIStoMSAG	BLUE RIDGE	196	30689.197721	29240048.088999
5060	Polygon	<Null>	P	<Null>	VINTON	51023	VA	GIStoMSAG	BLUE RIDGE	196	2127.795897	146682.385196
5062	Polygon	<Null>	P	<Null>	EAGLE ROCK	51023	VA	GIStoMSAG	EAGLE ROCK	198	38004.501675	31627944.329099
5063	Polygon	<Null>	P	<Null>	EAGLE ROCK	51023	VA	GIStoMSAG	EAGLE ROCK	190	39471.363797	70458311.386912
5064	Polygon	<Null>	P	<Null>	EAGLE ROCK	51023	VA	GIStoMSAG	EAGLE ROCK	199	29775.23614	40725726.967923
5065	Polygon	<Null>	P	<Null>	BUCHANAN	51023	VA	GIStoMSAG	BUCHANAN	193	40520.536061	35721443.034889
5066	Polygon	<Null>	P	<Null>	BUCHANAN	51023	VA	GIStoMSAG	BUCHANAN	194	6327.158308	2040514.94507
5067	Polygon	<Null>	P	<Null>	FINCASTLE	51023	VA	GIStoMSAG	FINCASTLE	192	3581.249999	485661.836446
5068	Polygon	<Null>	P	<Null>	FINCASTLE	51023	VA	GIStoMSAG	FINCASTLE	191	22975.22908	13708331.619164
5069	Polygon	<Null>	P	<Null>	TROUTVILLE	51023	VA	GIStoMSAG	TROUTVILLE	200	23482.12932	34845924.170118
5070	Polygon	<Null>	P	<Null>	TROUTVILLE	51023	VA	GIStoMSAG	TROUTVILLE	194	21466.056981	21198911.542822
5071	Polygon	<Null>	P	<Null>	DALEVILLE	51023	VA	GIStoMSAG	DALEVILLE	193	12965.987927	5051759.623858
5072	Polygon	<Null>	P	<Null>	TROUTVILLE	51023	VA	GIStoMSAG	TROUTVILLE	193	58664.350087	55380948.210146
5073	Polygon	<Null>	P	<Null>	FINCASTLE	51023	VA	GIStoMSAG	FINCASTLE	194	32659.931829	23542068.957784
5074	Polygon	<Null>	P	<Null>	TROUTVILLE	51023	VA	GIStoMSAG	TROUTVILLE	197	9812.1746	3694364.195727
5075	Polygon	<Null>	P	<Null>	TROUTVILLE	51023	VA	GIStoMSAG	TROUTVILLE	196	17216.417255	10197977.488115
5076	Polygon	<Null>	P	<Null>	ROANOKE	51023	VA	GIStoMSAG	ROANOKE	196	22759.591074	11087878.183234
5077	Polygon	<Null>	P	<Null>	ROANOKE	51023	VA	GIStoMSAG	ROANOKE	197	7711.325323	2678929.217422
5078	Polygon	<Null>	P	<Null>	ROANOKE	51023	VA	GIStoMSAG	ROANOKE	194	17449.808855	7961368.359873
5079	Polygon	<Null>	P	<Null>	CLOVERDALE	51023	VA	GIStoMSAG	CLOVERDALE	197	7657.409294	1174657.254116
5080	Polygon	<Null>	P	<Null>	TROUTVILLE	51023	VA	GIStoMSAG	TROUTVILLE	196	13572.410154	2573088.876407
5081	Polygon	<Null>	P	<Null>	BUCHANAN	51023	VA	GIStoMSAG	BUCHANAN	194	133.020764	900.482722
5083	Polygon	<Null>	P	<Null>	TROUTVILLE	51023	VA	GIStoMSAG	FINCASTLE	193	390.321842	8450.580076
4764	Polygon	<Null>	P	<Null>	BEDFORD	51019	VA	GIStoMSAG	BEDFORD	701	170963.514302	380391242.568798
4770	Polygon	<Null>	P	<Null>	SANDY LEVEL	51019	VA	GIStoMSAG	PITTSVILLE	709	3421.344857	469070.386547
4941	Polygon	<Null>	P	<Null>	PITTSVILLE	51019	VA	GIStoMSAG	PITTSVILLE	709	18652.745893	14820120.374606

MSAG Community

Geocode Zone

County FIPS

State

ESN

Statewide MSAG/ALI/GIS Analysis

OBJECTID_1 *	Shape *	LOCAL_ESN	LOCAL_COM	LOCAL_FIELD_USE	ZONE_GEOCODE	ESN_FIPS	ESN_STATE	CHECK	MSAG_COMM	MSAG_ESN	Shape_Length	Shape_Area	PSAP
5045	Polygon	<Null>	P	<Null>	NEW CASTLE	51045	VA	GIStoMSAG	NEWPORT	84	728.1245	17193.955466	Craig
5046	Polygon	<Null>	P	<Null>	NEWPORT	51045	VA	GIStoMSAG	NEW CASTLE	80	3055.444166	425099.376728	Craig
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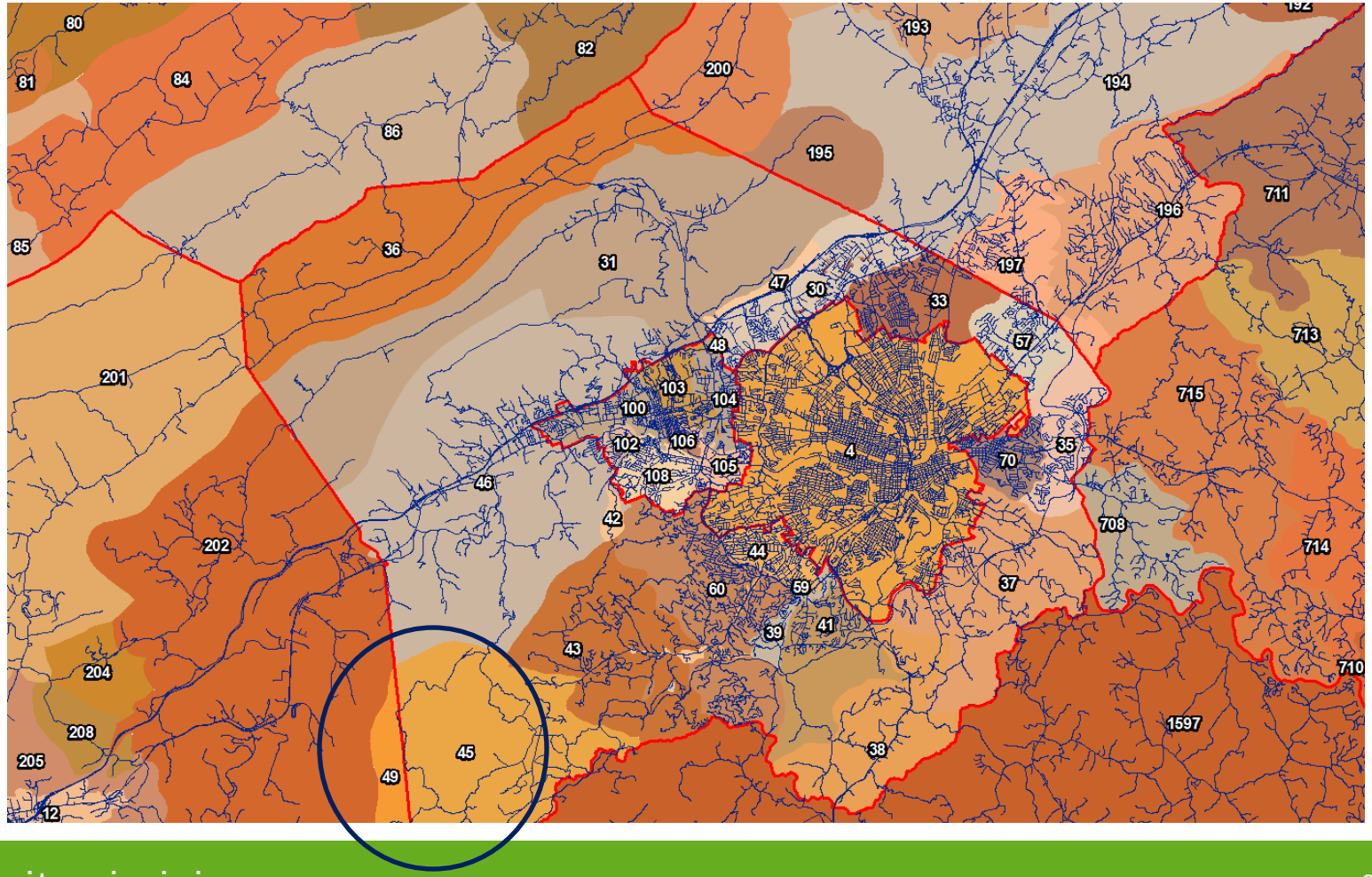
5075	Polygon	<Null>	P	<Null>	TROUTVILLE	51023	VA	GIStoMSAG	TROUTVILLE	196	17216.417255	10197977.488115	Botetourt
5076	Polygon	<Null>	P	<Null>	ROANOKE	51023	VA	GIStoMSAG	ROANOKE	196	22759.591074	11087878.183234	Botetourt
5077	Polygon	<Null>	P	<Null>	ROANOKE	51023	VA	GIStoMSAG	ROANOKE	197	7711.325323	2678929.217422	Botetourt
5078	Polygon	<Null>	P	<Null>	ROANOKE	51023	VA	GIStoMSAG	ROANOKE	194	17449.808855	7961368.359873	Botetourt
5079	Polygon	<Null>	P	<Null>	CLOVERDALE	51023	VA	GIStoMSAG	CLOVERDALE	197	7657.409294	1174657.254116	Botetourt
5080	Polygon	<Null>	P	<Null>	TROUTVILLE	51023	VA	GIStoMSAG	TROUTVILLE	196	13572.410154	2573088.876407	Botetourt
5081	Polygon	<Null>	P	<Null>	BUCHANAN	51023	VA	GIStoMSAG	BUCHANAN	194	133.020764	900.482722	Botetourt
5083	Polygon	<Null>	P	<Null>	TROUTVILLE	51023	VA	GIStoMSAG	FINCASTLE	193	390.321842	8450.580076	Botetourt
4764	Polygon	<Null>	P	<Null>	BEDFORD	51019	VA	GIStoMSAG	BEDFORD	701	170963.514302	380391242.568798	Bedford
4770	Polygon	<Null>	P	<Null>	SANDY LEVEL	51019	VA	GIStoMSAG	PITTSVILLE	709	3421.344857	469070.386547	Bedford
4941	Polygon	<Null>	P	<Null>	PITTSVILLE	51019	VA	GIStoMSAG	PITTSVILLE	709	18652.745893	14820120.374606	Bedford

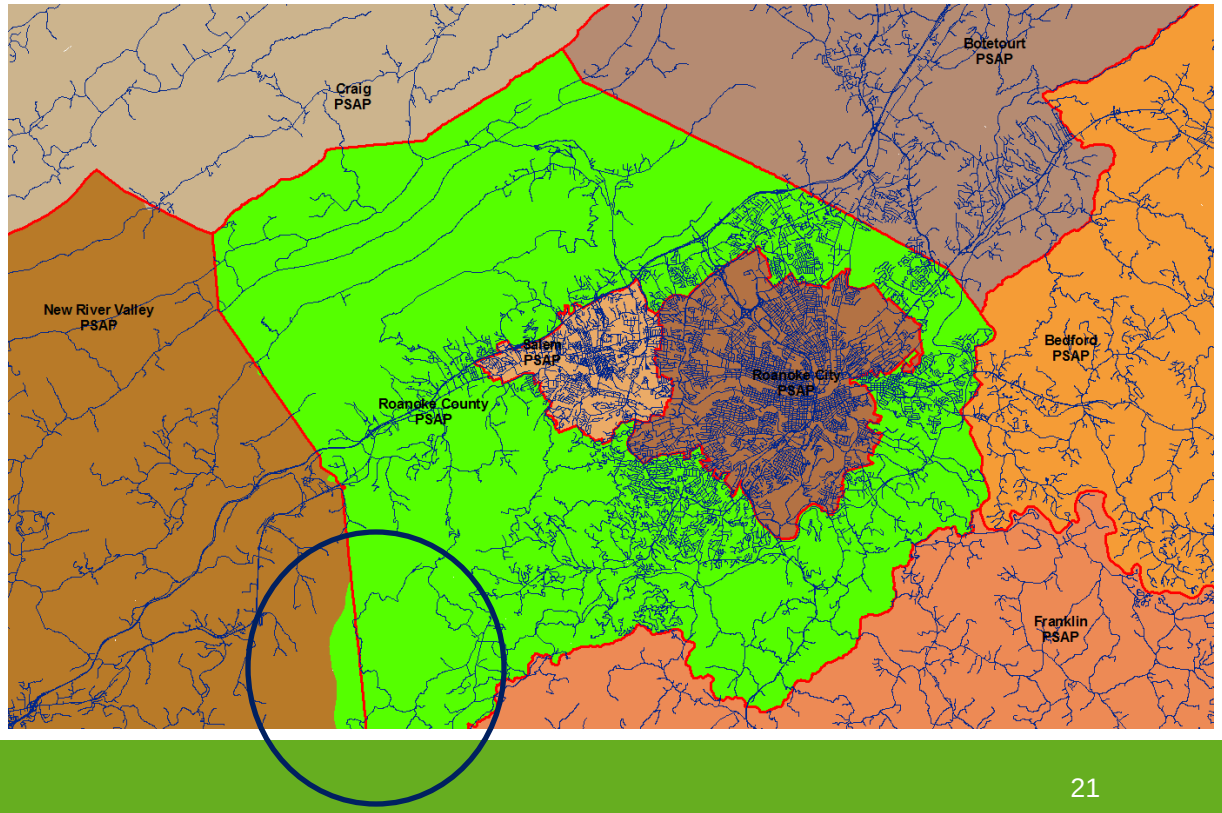
Note: ESNs are generally numbered similarly within a PSAP service area

Example: Depiction by ESN



Example Map: PSAPs

- Uses grouping of similarly numbered ESNs as a starting point



Discussion Questions

- Do we want a schema that provides additional detail beyond the required fields in the NENA NG9-1-1 GIS Data Model?
- Specific Examples:
  - Is there a need or desire to:
    - Differentiate between portions of a PSAP that fall in different counties or cities? If so, should we add the name and/or FIPS?
    - Include the FCC ID (perhaps for reporting/related data)?

Next Steps:

- Provide a copy of an initial draft for the standard to workgroup members
- Future meeting discussion
  - Review Draft Standard
  - Boundary Coordination
  - Shorelines and Waterways

- Next meeting: Wednesday February 15th, 2017 from 10am-11am